

## CHAPTER 1

### INTRODUCTION

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#### 1-1. Purpose.

This manual prescribes the criteria for the design of concrete floor slabs on grade in buildings for heavy loads and is applicable to all elements responsible for military construction. Heavy loads in buildings such as warehouses include moving loads, stationary live loads, and wall loads.

#### 1-2. Scope.

Theoretical concepts, practical applications, basis of design, and design procedures for heavy loads are discussed in this manual. Related criteria for light-loaded areas such as office spaces are separately treated in TM 5-809-2/AFM 88-3, Chap. 2. Criteria for areas subjected to vibratory loadings are included in TM 5-81 8-1/AFM 88-7, Chap. 1. For design criteria outside the scope of this manual, industry standards are recommended.

#### 1-3. Definitions.

The following definitions have been adopted for the manual:

*a. Slab on grade.* Concrete slab supported directly on foundation soil.

*b. Light loads.* Loads which consist of (comparable) forklift axle load of 5 kips or less and stationary live loads less than 400 pounds per square foot.

*c. Heavy loads.* Loads which consist of any one of the following: moving live loads exceeding a forklift axle load of 5 kips, stationary live loads exceeding 400 pounds per square foot, and concentrated wall loads exceeding 600 pounds per linear foot.

*d. Wall load.* Concentrated loads imposed by walls or partitions.

*e. Dead load.* All the materials composing the permanent structure, including permanent wall loads and all equipment that is fixed in position.

*f. Live load.* Loads imposed by the use and occupancy of the structure.

(1) *Moving live load.* Loads imposed by vehicular traffic such as forklift trucks.

(2) *Stationary live load.* Loads imposed by movable items such as stored materials.

*g. Vibratory loads.* Dynamic and/or oscillatory loading of significant magnitude.

*h. Design load.* The effects of stationary live, dead, and wall loads and moving live loads. Dead loads of floor slabs on grade are ignored.

*i. Special soils.* Soils which exhibit undesirable properties for construction uses such as high compressibility or swell potential.

*j. Nonreinforced slab.* Concrete slab resting on grade containing minimal distributed steel, usually of welded wire fabric (WWF), for the purpose of limiting crack width due to shrinkage and temperature change.

*k. Reinforced slab.* Concrete slab resting on grade containing steel reinforcement which consists of either a welded wire fabric or deformed reinforcing steel bars.

#### 1-4. Basic considerations.

Concrete floor slabs on grade are subjected to a variety of loads and loading conditions. The design procedure includes determining slab thickness based on moving live loads and then checking adequacy of slab thickness for stationary live load. The design procedure separately includes determining thickness of slab under wall load. The entire design procedure is based on a working stress concept. Stresses induced by temperature gradients and other environmental effects are taken into account by the assignment of working stresses. Working stresses have been established empirically based on experience gained in roadway and airfield pavement performance data.

#### 1-5. References.

Appendix A contains a list of references used in this document.